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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/073,755	02/11/2002	Charles T. Black	YOR9-2001-0467-US1	4528

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EXAMINER

ZAVERI, SUBHASH

ART UNIT

PAPER NUMBER

2862

DATE MAILED: 03/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/073,755

Applicant(s)

BLACK ET AL.

Examiner

Subhash A Zaveri

Art Unit

2862

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAIL ACTION**

1 The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

2 This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102((e), f) or (g) prior art under 35 U.S.C. 103(a).

3 This application has been filed with informal drawings, which are acceptable for examination purposes only. Formal drawing will be required when the application is allowed. Please note the comments of the draft person on PTO Form 948.

### **Claim Rejections 35 USC §103**

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter, as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. patentability shall not be negated by the manner in which the invention was made.

5        **Claims 1 –28** are rejected under 35,U.S.C. 103(a) as being unpatentable over Black et al. (US 6,162,532) in view of Inomata et al. "Spin-dependent tunneling through layered ferromagnetic Nanoparticles", Applied Physics Letters, Volume 73, #8, 08/24/1998.

**As to claims 1 and 20**, Black et al. disclose a magnetic-field sensor device and a method as shown in Figs.1-7 comprising:

          two electrodes 4B and 4C of Figs.4- 5, an insulating layer 7B of Fig.5 separating the two layers;

          one layer of chemically-synthesized magnetic nano-particles 1 of Fig.5 located between the layers;

      Black et al. lacks in showing two electrodes layers and magnetic-nano-particles located between the two electrodes layers. Inomata et al. is cited to show these two electrodes layers with the magnetic-nano-particles located between the two electrodes layers as shown in Fig.1 (page 1144, line 7-50). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include this type of configuration structure of

Inomata et al for magnetic nano-particles sensor system in Black et al. structure system to provide accurate efficient and high impedance sensitivity magnetic nano-particles structure device for detecting magnetic field.

**As to claims 2-5,6-7,10, 21-23** Inomata et al. disclose a magnetic-field sensor device and a method as shown in Figs.1-3 comprising:

the two electrodes include a magnetic material as shown in Figs.1-2 (page 1144, line 7-50);

the two electrodes is one of a non-magnetic metal and a semiconductor as shown in Figs.1-2 (page 1143, line 7-50);

the chemically-synthesized magnetic nano-particles range in size between 2 nm and 20 nm in diameter as shown in Figs.1-3 (page 1144, line 5-50);

the chemical synthesized magnetic nano-particles are oriented with a magnetic-moment orientation parallel to a direction of current flow through said chemically-synthesized magnetic nano-particles Figs.1-3 (page 1144-45, line 5-50);

the insulating organic laver separates the chemically-synthesized magnetic nano-particle layer from another chernically synthesized magnetic nan-oparticle layer as shown in Figs.1-2 (page 1144-45, line 7-50);

**As to claims 8-9, and 24** Black et al. disclose a magnetic-field sensor device and a method as shown in Figs.1-7 Comprising:

a layer 4A of Fig.2-4 of particles comprises one chemically-synthesized magnetic nano-particle 1 of Fig.2-5;

the chemically- synthesized magnetic nano-particles comprise elements comprising one of Co, Fe, Ni, Mn, Cr, Nd, Pr, Pt, Pd, Ho, Gd, Eu. Er, Re, Rh. an inter-metallic compound of said elements, a binary alloy of said elements, a ternary alloy of said elements, an oxide comprising one of Fe, Co, Ni, Mn, and Cr, and a mixed oxide combining at least one of Fe, Co, Ni. Mn, and Cr. with at least one of La., Sr, Ba, and CU as shown in Figs.2-5 (column 7-8, line 10-68).

**As to claims 11 and 25**, Black et al. disclose a magnetic-field sensor device and a method as shown in Figs.1-7 comprising:

two electrodes 4B and 4C of Figs.4- 5, an insulating layer 7B of Fig.5 separating the two layers;

one layer of chemically-synthesized magnetic-nano-particles 1 of Fig.5 located between the layers.

Black et al. lacks in showing two electrodes layers and the magnetic-nano-particles located between the two electrodes layers. Inomata et al. is cited to show this two electrodes layers with the magnetic-nano-particles

located between the two electrodes layers as shown in Fig.1 (page 1144, line 7-50). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include this type of configuration of Inomata et al for magnetic non-particles sensor system in Black et al. system to provide accurate efficient and high impedance sensitivity magnetic non-particles structure device for detecting magnetic field.

The two electrodes include a magnetic material as shown in Figs.1-2 (page 1144, line 7-50).

**As to claims 12-17 and 26-27** Inomata et al. disclose a magnetic-field sensor device and a method as shown in Figs.1-3 comprising:

the two electrodes include a magnetic material as shown in Figs.1-2 (page 1144, line 7-50);

the two electrodes is one of a non-magnetic metal and a semiconductor as shown in Figs.1-2 (page 1143, line 7-50);

the chemically-synthesized magnetic nano-particles range in size between 2 nm and 20 nm in diameter as shown in Figs.1-3 (page 1144, line 5-50);

the chemical synthesized magnetic nano-particles are oriented with a magnetic-moment orientation parallel to a direction of current flow through said chemically-synthesized magnetic nano-particles Figs.1-3 (page 1144-45, line 5-50). the insulating organic laver separates the

chemically-synthesized magnetic nano-particle layer from another chemically synthesized magnetic nano-particle layer as shown in Figs.1-2 (page 1144-45, line 7-50).

**As to claims 18-19, and 28** Black et al. disclose a magnetic-field sensor device and a method as shown in Figs.1-7 comprising:

a layer 4A of Fig.2-4 of particles comprises one chemically-synthesized magnetic nano-particles 1 of Fig.2-5;

the chemically- synthesized magnetic nano-particles comprise elements comprising one of Co, Fe, Ni, Mn, Cr, Nd, Pr, Pt, Pd, Ho, Gd, Eu, Er, Re, Rh. an inter-metallic compound of said elements, a binary alloy of said elements, a ternary alloy of said elements, an oxide comprising one of Fe, Co, Ni, Mn, and Cr, and a mixed oxide combining at least one of Fe, Co, Ni., Mn, and Cr. with at least one of La., Sr, Ba, and CU as shown in Figs.2-5 (column 7-8, line 10-68).

#### **Prior Art cited**

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Aonuma et al. (US 4063000) is cited to show a process for producing ferromagnetic powder.

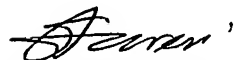


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Any inquiry concerning this communication or earlier communication from the examiner should be directed to Subhash Zaveri whose telephone number is (703) 305 1972. The examiner can normally be reached on Monday-Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner supervisor, Edward Lefkowitz, can be reached on (703) 305-4816. The faxed phone number for this group is (703) 305-3432.

Any inquiry of general nature or relating to the status of this application should be directed to the Customer Service at (703) 308-0596.



Subhash Zaveri  
Patent Examiner  
Tech Center 2862  
March 19, 2003.



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